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THE following communications were read :—

I. Extract of a letter from Professor Santini to Professor Airy, dated Nov. 23, 1832. Communicated by Professor Airy.

M. Santini succeeded in making several observations of Biela's comet, as follow :—

	Mean Time at Padua.			Comet's R.A.			Comet's Declination.		
1832.	h	m	s	°	′	″	°	′	″
Oct. 31.	16	34	43,1	149	35	42,7	+10	43	41,8
	17	10	10,6	149	38	7,9	+10	42	5,3
Nov. 4.	15	57	17,0	155	18	15,4	+ 6	34	44,5
	16	27	2,0	155	19	11,8	+ 6	32	42,5
18.	16	9	44,9	172	46	22,9	− 6	24	52,6
	16	28	27,9	172	47	17,0	− 6	24	50,3
19.	16	30	10,4	173	54	19,0	− 7	13	13,7
	17	17	56,2	173	56	45,9	− 7	14	49,7

On his own observations and those of Sir J. Herschel, M. Santini observes :—

"It is remarkable that its place should have been found nearly intermediate between my ephemeris and that of M. Damoiseau; from which it seems to follow, that the line of perihelion passage was badly determined in both, which is probably owing to the assumption of a constant orbit through the whole period, in the calculation of the co-ordinates for the computation of the perturbations; and as, in May of last year, the comet approached very near to Jupiter, a slight error in these co-ordinates may have had a sensible influence on the perturbation of mean motion, on which depends the return to perihelion.

"I looked carefully for Biela's comet on several evenings in September, with the equatorial of this observatory, but I could not discover any thing that had the least resemblance to a comet. The telescope is one of Fraunhofer's, of three inches aperture, and is very clear. I hear that it was observed at Rome on Sept. 24, with a telescope made by Cauchoix, of eight inches aperture, and that it was extremely faint. I was absent from the observatory from the middle of October to the 31st, on which evening I found it easily between the places given by the two systems of elements, as you inform me Sir J. Herschel saw it in September. At Milan it was observed on Oct. 24. On the last evenings it was very faint and very difficult to observe: in general, the least disturbance of the atmosphere extinguished it entirely."

II. Various observations made at the observatory of St. Helena by Lieutenant Johnson; consisting of,

1. Stars observed with the Moon from March to July, 1832.

2. Observation of the solstice of June 1832, containing thirteen direct observations and six by reflection. From the mean of these the following values are obtained, reduced to the 1st of January, 1830:—

N. P. D. of Solstice	66°	32′	16″,45
Obliquity	23	27	43 ,55
The Latitude being	15	55	24 ,00

The circle used in the observation was carefully protected from the Sun's rays.

3. Observation of the Solar Eclipse of July 27, 1832. The first two observations were made by Mr. Armstrong, with a 40-inch achromatic by Berge, power 686; and the last by Mr. Johnson, with a 6-feet achromatic by Gilbert, power 102.

	h	m	s
Beginning* of the Eclipse	2	33	5,4
End	3	32	24,3
End	3	32	25,3

III. Investigation of a rule for clearing the apparent distance of the centres of the Sun and Moon from the effects of parallax and refraction. By Charles Blackburn, B.A., late R.M. College.

In the Monthly Notice for May 1832 is given a formula of Baron Zach for the solution of this problem. The method proposed by Mr. Blackburn is similar in principle, so far as it consists in determining the true distance by the application of certain corrections to the apparent distance; but differs in the manner of obtaining the corrections, which are two in number instead of four. The process is as follows:—

Let δ be the observed distance of the two centres; σ and μ the observed altitudes of the Sun and Moon; $\sigma - d\sigma$ and $\mu + d\mu$ the true altitudes; and S and M the angles made by the observed distance with the verticals passing through the Sun and Moon respectively.

Then $d\delta$ being the correction to be applied to the observed, in order to obtain the true, distance,

$$d\delta = \cos S\, d\sigma - \cos M\, d\mu$$
$$\sin^2 \tfrac{1}{2} S = \operatorname{cosec} \delta \sec \sigma \cos \Sigma \sin (\Sigma - \mu)$$
$$\sin^2 \tfrac{1}{2} M = \operatorname{cosec} \delta \sec \mu \cos \Sigma \sin (\Sigma - \sigma)$$
$$\Sigma = \frac{\delta + \sigma + \mu}{2}$$

Where either of the angles S or M is greater than 90°, the corresponding correction changes its sign.

Mr. Blackburn remarks, "The advantages of this method are, that it is in itself concise; the two parts into which it is divided are perfectly symmetrical, and therefore easily remembered; in looking out the logarithms the seconds may be omitted, and the

* The Eclipse had begun about 10^s before this time was noted.

logarithms taken to four places only; the altitudes themselves are used instead of the zenith distances, which saves the trouble of reduction, and lessens the probability of error."

IV. Observation of the Transit of Mercury of May 5, 1832. Made at Utrecht, by Professor Moll.

The author first notices the observations made in Holland at the preceding transits of Mercury in 1661, 1697, 1753, 1799, and 1802, and then proceeds to state the preparations that were made to observe the present transit. He previously computed the exact times at which the several phases might be expected to take place; but unfortunately the weather was so unfavourable for several days preceding, that no observations could be made for deducing the correct time; and, moreover, the wires of the transit instrument were at that time broken, and consequently could not be used. But, on the 5th, 7th, and 8th of May, several sets of corresponding and single altitudes of the Sun were taken, and the correct times thence deduced.

The telescopes used on the occasion were:—

No. 1. An achromatic by Fraunhofer, of 6 French feet focus, and 52 French lines, or 4,7 English inches clear aperture, power 64.

No. 2. A 42-inch achromatic by Dollond, of $2\frac{7}{8}$-inch aperture, on an equatorial stand, power 76.

No. 3. A Cassegrainian reflector, by Vander Bildt, of $2\frac{1}{2}$-feet focus, $4\frac{1}{2}$-inch aperture, and power of 150.

No. 4. A small Gregorian, power 36.

No. 5. A 42-inch achromatic, by Wilson.

"There was, at intervals, a very strong wind, which compelled me to use small powers. On the whole, I consider the stand of the Fraunhofer one of the worst contrivances which I have ever seen.

"The following table contains the result of the observations:—

Transit of Mercury over the Sun's Disc, observed at Utrecht, 5th of May, 1832.

Obs.	Date. 1832.	Observed Mean Utrecht Time.	Calculated Mean Utrecht Time.	Difference between Observation and Calculation.	Observer's Name.	Telescope.
Ingress.	May 4th.	$21^h20^m\ 7^s,801$	$21^h19^m31^s,44$	$-0^m36^s,4$	V. Beek, jun.	4
Exterior Contact.		41,268		+1 9,8	G. R. Fockens.	2
		43,268		1 11,8	Dr. Moll.	1
Interior Contact.	4th.	21 23 24,743	21 22 37,44	0 47,3	Dr. Van Beek.	3
		25,273		0 47,8	G. R. Fockens.	2
		25,273		0 47,8	Dr. Moll.	1
Egress.	5th.	4 5 56,957	4 6 59,61	1 2,7	G. R. Fockens.	1
Interior Contact.		6 6,957		0 52,7	Dr. Moll.	2
		8,366		0 51,2	Dr. Van Rees.	5
		8,766		0 50,8	V. Beek, jun.	4
Exterior Contact.	5th.	4 9 10,236	4 11 5,61	1 55,4	Dr. Van Beek.	3
		14,962		1 50,6	Dr. Moll.	2
		17,962		1 47,6	G. R. Fockens.	1

"The Sun's limb was undulating throughout, and near the time of the last contact my telescope was violently shaken by gusts of wind. Immediately after the transit the sky became dark and cloudy.

"The differences between the results of the several observers do not appear greater than on former occasions, and in general they are smaller. In many instances even greater differences have taken place between the results of very able observers.

"The differences between the observations of Mr. Fockens and mine are as follow:—

Ingress	1st	contact,	2″
	2d	do.	0″
Egress	3d	do.	50″
	4th	do.	3″

"But at the third contact, my observation agrees very well with those of the others, the differences being,

with Dr. Van Rees, 1″,4
Van Beek, Junior, 1″,8.

"At the last contact of the egress, my observation differs from that of

Dr. Van Beek, 4″,7.

"On former opportunities, astronomers have often not agreed quite so well.

"The planet appeared perfectly round, nor could any of us distinguish any appearance of ellipticity near the egress or ingress, as has been said by other observers.

"I am led to suspect that M. Van Beek, jun., in his eagerness not to miss the first impression, imagined that he saw the ingress a little too soon. However, although his telescope was the weakest, his eyes were the youngest, and this certainly is an advantage.

"Even with such small powers as 64 and 76 of the achromatic telescopes of Fraunhofer and Dollond, I could plainly perceive a grayish spot on the dark disc of Mercury. As soon as I had perceived it, I asked my assistants whether they saw any thing particular on Mercury. One of them instantly replied, '*Do you mean the white spot?*' On applying higher powers (as 110 and 180 to the 42-inch, and 96, 144, 216, and 324 to the 6-feet), the same appearance was always visible. Its periphery was not well defined, but seemed gradually to sink from a grayish white to the dark colour of the planet's disc. It constantly appeared on the same part of the disc.

"After the observation, looking in Schröder's *Hermographic Fragments*, I was much surprised to find that both Schröder and Professor Harding had observed a similar appearance during the transit of 1799. They even attempt a delineation of the object, in which there are two separate spots. I cannot say that I saw any thing resembling this, as it seemed to me and others that there was one grayish, undefined spot on the black disc of Mercury.

"I must not here omit the circumstance, that this gray spot wa most clearly visible when the eye had had some rest. On applying it then to the glass, it was most easily distinguished.

"The observers at Dr. Van Beek's house saw nothing of this singular phenomenon.

"Some observers state, that in former transits a coloured lighter ring seemed to surround the orb of Mercury on the Sun's disc. According to Plantade, an appearance of the sort was seen at the transit of 1736. Flaugergues saw the same in May 1786, in Nov. 1789 and 1799. He calls it an illuminated ring, *un anneau lumineux*. Nothing, however, of the kind is mentioned in Delambre's account of the transit of 1799, nor in that of Messier of that of 1786. Prosperin and Ferner, however, speak of it as observed during the transit of 1786. But the most circumstantial account of the phenomenon is that of Harding and Schröder, during the transit of 1799. They describe it exactly as we saw it, both with the 42-inch and 6-feet telescopes. *A nebulous ring of a darker tinge, approaching to the violet-colour, appeared to surround Mercury's disc.* Near the planet the colour was darkest. Now, what we saw, and Schröder and Harding saw, is exactly the reverse of what is mentioned by Plantade and Prosperin. They talk of *a luminous ring;* we saw, or at least think we saw, *a darker, more deeply-coloured zone surrounding Mercury.* Ljungberg saw also a dark, nebulous ring round Mercury, at Copenhagen, in 1802.*

"Professor Uylenbroek, of Leyden, allows me to transmit to the Society the observations of Mercury's transit, as made in that university by him and his assistant, Mr. Kaiser. They only obtained an observation of the ingress, the clouds making the egress invisible.

INGRESS.	Mean Leyden Time.	
First, or exterior contact...	$9^h\ 18^m\ 11^s,42$	By Prof. Uylenbroek, with a 42-in.
Second, or interior contact.	9 20 42,42	achromatic by Dollond.
First contact.....	9 17 50,62	Mr. Kaiser, with a 7-feet achro-
Second contact	9 20 50,22	matic by Dollond."

V. Occultation of Saturn by the Moon. Observed at Utrecht by Dr. Moll and Mr. G. R. Fockens, 8th of May, 1832.

Observation.	Dr. Moll.	Mr. Fockens.
Immersion.	Mean Time.	Mean Time.
Satellite	.....	$9^h 26^m 27^s,48$
Ring, 1st limb.....	$9^h 34^m 28^s,49$	9 34 22,49
Saturn, 1st limb .	.....	.....
Saturn, 2d limb ...	.....	9 35 32,49
Ring, 2d limb.....	9 36 9,49	9 36 4,49
Emersion.		
Ring, 1st limb.....	10 27 38,58	10 27 30,58
Saturn, 1st limb...	.....	.....
Saturn, 2d limb...	10 28 14,58	10 28 0,58
Ring, 2d limb.....	.....	10 28 6,58

* Zach. Monatl. Corresp. vol. viii. 1803, p. 335.

The same phenomenon was observed at Leyden, by Professor Uylenbroek and Mr. Kaiser, as follows:

Immersion.	h	m	s
Ring's first limb.	9	30	43,2
Saturn's first limb.....	9	31	0,2
Saturn's second limb.....	9	31	59,2
Ring's second limb.....	9	32	31,2

Emersion not observed, on account of clouds.

VI. Remarks on the fifth Catalogue of Double Stars, communicated to the Society, June 7th, 1832. By Sir J. F. W. Herschel.

An account of this communication, the reading of which is not yet finished, will appear in the next Monthly Notice.

VII. Stars observed with the Moon at the Royal Observatory, Greenwich, in the months of October and November, 1832.

There are no observations for September, the transit instrument being then under repair.

		Time by the Transit Clock. h m s	Daily losing rate.
Oct. 2.	o Sagittarii.....	18 54 5,42	s
	Moon 1 L.....	19 24 30,94	0,50
	57 Sagittarii.....	41 54,68	
5.	δ Capricorni	21 37 13,34	
	Moon 1 L.....	57 54,24	0,48
	D Aquarii.....	22 9 27,10	
	σ ———	21 12,92	
6.	D Aquarii.....	22 9 26,78	
	σ ———	21 12,80	0,50
	Moon 1 L.....	47 26,88	
	χ^3 Aquarii.....	23 9 40,90	
8.	p Piscium.....	23 50 31,24	
	s ———	56 11,18	0,45
	Moon 1 L.....	0 26 59,00	
	26 Ceti	55 37,54	
16.	β Geminorum.....	7 35 21,94	0,64
	Moon 2 L.....	8 7 41,32	
Nov. 4.	(190) Aquarii	23 40 2,90	
	r Piscium.....	53 29,08	0,68
	Moon 1 L.....	0 4 49,92	
	(120) Piscium	27 3,90	
6.	f Piscium	1 9 16,30	
	ν ———	32 49,74	0,66
	Moon 1 L	45 36,56	
	ξ^2 Ceti...	2 19 22,18	
7.	ξ^2 Ceti.....	2 19 21,96	
	Moon 1 L	39 7,38	0,64
	(4) Ceti	3 2 16,86	
	f Tauri	21 44,26	
29.	Moon 1 L	22 7 38,10	
	σ Aquarii.....	22 32,40	0,84
	70 ———	40 26,90	

VIII. Stars observed with the Moon, at the Cambridge Observatory, in November and December 1832.

		Time by the Transit Clock. h m s	Daily losing rate. s
Nov. 1.	Moon 1 L.....	21 36 34,29	3,13
	ι Aquarii	56 15,82	
4.	(190) Aquarii	23 38 39,55	2,72
	τ Piscium	52 5,87	
	Moon 1 L.....	0 3 25,61	
	(120) Piscium	25 40,90	
5.	(120) Piscium	0 25 38,58	2,42
	Moon 1 L	53 0,68	
28.	Moon 1 L.....	21 16 19,35	2,17
	δ Capricorni	36 32,03	
Dec. 15.	δ Virginis	12 46 14,71	2,20
	Moon 2 L.....	13 10 26,54	

December 10, at $12^h\,21^m\,53^s,86$ Cambridge sidereal time, or $19^h\,1^m\,32^s,8$ Greenwich mean solar time, δ Cancri disappeared at the Moon's bright limb. The limb was uneven, and the star seemed to run along one long mountain slope before it disappeared. The time is uncertain two or three seconds.

There was laid on the table, amongst other presents, a MS. copy of Dr. Halley's astronomical observations made at the Royal Observatory at Greenwich, copied from the originals by order of the Lords Commissioners of the Admiralty, and by them presented to the Society.

J. Moyes, Castle Street, Leicester Square.